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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/772,822	02/05/2004	Vijayan Rajan	112056-0159 / P01-1727	5952
24267 7590 12/26/2007 CESARI AND MCKENNA, LLP 88 BLACK FALCON AVENUE BOSTON, MA 02210			EXAMINER SAVLA, ARPAN P	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

mn

Office Action Summary	Application No. 10/772,822	Applicant(s) RAJAN ET AL.	
	Examiner Arpan P. Savla	Art Unit 2185	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15, 19, 20 and 23-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15, 19, 20 and 23-39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. <u>20071219</u> |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 1, 2007 has been entered.

Response to Amendment

This Office action is in response to Applicant's communication filed October 1, 2007 in response to the Office action dated July 2, 2007. Claims 1-5, 9-, 10, 19, and 20 have been amended. Claims 16-18, 21, and 22 have been cancelled. New claims 23-39 have been added. Claims 1-15, 19, 20, and 23-39 are pending in this application.

OBJECTIONS

Claims

1. **Claims 1, 5, 27, and 35** are objected to because of the following informalities:
2. **As per claim 1**, the space between "created" and the period on line 27 should be deleted.
3. **As per claims 5, 27, and 35**, the word "the" before the colon in each of the preambles should be deleted.

Appropriate correction is required.

REJECTIONS BASED ON PRIOR ART

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. **Claims 23, 31, and 39** rejected under 35 U.S.C. 102(e) as being anticipated by Cameron et al. (U.S. Patent 7,165,156) (hereinafter "Cameron").

5. **As per claims 23 and 39**, Cameron discloses a method for operating a data storage system, comprising:

creating a writable virtual disk (vdisk) at a selected time, the writable vdisk referencing changes in data stored in the data storage system after the writable vdisk was created, the writable vdisk having a plurality of holes where each hole is at a location referencing data which has not been changed since the writable vdisk was created (col. 1, lines 61-64; col. 7, lines 14-17; Fig. 1, element 202; Fig. 7, element 602); *It should be noted that the computer readable medium of claim 39 executes the exact same functions as the method of claim 23. Therefore, any reference(s) that teach claim 23 also teach corresponding claim 39. It should also be noted that "RWSS 202"*

is analogous to the "writable vdisk." Lastly, it should also be noted that for a distinct period of time between when RWSS 202 is created and when RSS 202 receives its first write, RWSS 202 is completely filled with all "holes."

maintaining a backing store, the backing store referencing the data stored in the data storage system which has not been changed since the writable vdisk was created (col. 7, lines 18-20; Fig. 1, element 204-j; Fig. 7, element 604); *It should be noted that "ROSS 204-j" is analogous to the "backing store."*

searching each field of the writable vdisk for a hole; and referencing each hole in the writable vdisk to point to the data block referenced by the corresponding backing store indirect block to update the writable vdisk to reference both the data which is unchanged since the writable vdisk was created and the data which has been changed since the writable vdisk was created (col. 7, lines 18-24). *It should be noted that between the time RWSS 204 is created and ROSS 204-j is created, there are no writes to RWSS 204, therefore, all the blocks in RWSS 202 are "holes." Thus, at the point in time when ROSS 204-j is created from RWSS 204, in effect all the "holes" (i.e. blocks) in RWSS 204 are "searched" in order for each hole/block in RWSS 204 to be properly referenced to point to the corresponding block referenced by ROSS 204-j. In other words, the mere creation of ROSS 204-j from RWSS 204 [in the case where this occurs before there have been any writes to RWSS 204] inherently requires Cameron to perform both the "searching" and "referencing" as described in the claims above. It should also be noted that RWSS 204 references both data which is unchanged (using*

ROSS 204-j as described above) and data which has been changed (Fig. 7, element 616) since (i.e. after) RWSS 204 was created.

6. **As per claim 31**, Cameron discloses a data storage system, comprising:

a writable virtual disk (vdisk) created at a selected time, the writable vdisk referencing changes in data stored in the data storage system after the writable vdisk was created, the writable vdisk having a plurality of holes where each hole is at a location referencing data which has not been changed since the writable vdisk was created (col. 1, lines 61-64; col. 7, lines 14-17; Fig. 1, element 202; Fig. 7, element 602); *See the citation note for the similar limitation in claims 23 and 39 above.*

a backing store, the backing store referencing the data stored in the data storage system which has not been changed since the writable vdisk was created (col. 7, lines 18-20; Fig. 1, element 204-j; Fig. 7, element 604); *See the citation note for the similar limitation in claims 23 and 39 above.*

a processor to search each field of the writable vdisk for a hole; and the processor to reference each hole in the writable vdisk to point to the data block referenced by the corresponding backing store indirect block to update the writable vdisk to reference both the data which is unchanged since the writable vdisk was created and the data which has been changed since the writable vdisk was created (col. 2, lines 31-35; col. 7, lines 18-24). *See the citation note for the similar limitation in claims 23 and 39 above.*

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. **Claims 1-15, 19, 20, and 24-30, and 32-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cameron in view of Haskin et al. (U.S. Patent Application Publication 2003/0158863) (hereinafter "Haskin").**

9. **As per claims 1 and 20**, Cameron discloses a method for operating a data storage system, comprising:

creating a writable virtual disk (vdisk) at a selected time, the writable vdisk referencing changes in data stored in the data storage system after the writable vdisk was created, the writable vdisk having a plurality of holes where each hole is at a location referencing data which has not been changed since the writable vdisk was created (col. 1, lines 61-64; col. 7, lines 14-17; Fig. 1, element 202; Fig. 7, element 602); *See the citation note for the similar limitation in claims 23 and 39 above.*

maintaining a backing store, the backing store referencing the data stored in the data storage system which has not been changed since the writable vdisk was created (col. 7, lines 18-20; Fig. 1, element 204-j; Fig. 7, element 604); *It should be noted that the computer readable medium of claim 20 executes the exact same functions as the method of claim 1. Therefore, any reference(s) that teach claim 1 also teach*

corresponding claim 20. Also, see the citation note for the similar limitation in claims 23 and 39 above.

searching each field of the writable vdisk for a hole; and referencing each hole in the writable vdisk to point to the data block referenced by the corresponding backing store indirect block to update the writable vdisk to reference both the data which is unchanged since the writable vdisk was created and the data which has been changed since the writable vdisk was created (col. 7, lines 18-24). *See the citation note for the similar limitation in claims 23 and 39 above.*

Cameron does not expressly disclose loading blocks of the writable vdisk from a disk into a memory, the loaded blocks including a writable vdisk indirect block having a plurality of fields, each field storing a valid pointer to a data block or an invalid pointer representing a particular hole of the plurality of holes;

loading blocks of the backing store from a disk into memory, the loaded blocks including a backing store indirect block having a plurality of fields, each backing store indirect field corresponding to a field of the writable vdisk indirect block, one or more backing store indirect block fields having a pointer to a data block.

Haskin discloses loading blocks of the writable vdisk from a disk into a memory, the loaded blocks including a writable vdisk indirect block having a plurality of fields, each field storing a valid pointer to a data block or an invalid pointer representing a particular hole of the plurality of holes (paragraph 0053; paragraph 0063; Fig. 2B);

loading blocks of the backing store from a disk into memory, the loaded blocks including a backing store indirect block having a plurality of fields, each backing store

indirect field corresponding to a field of the writable vdisk indirect block, one or more backing store indirect block fields having a pointer to a data block (paragraph 0053; paragraph 0095; Fig. 8D); *It should be noted that the "snapshot data set" is analogous to the "backing store."*

Haskin and Cameron are analogous art because they are from the same field of endeavor, that being file system snapshots.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to apply Haskin's ditto address feature to Cameron's snapshots because all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded the predictable results of efficiently utilizing system kernel memory within data processing equipment to support time sensitive processing tasks such as external data communications processing.

Therefore, it would have been obvious to combine Cameron and Haskin for the benefit of obtaining the invention as specified in claims 1 and 20.

10. **As per claim 2**, the combination of Haskin/Cameron discloses dirtying the data block pointed to by the backing store indirect block to enable write allocation of the dirty data block without altering a data content of the data block (Haskin, paragraph 0079). *It should be noted that replacing the address of the allocated block is in effect "dirtying" the block without altering the content.*

11. **As per claim 3**, the combination of Haskin/Cameron discloses

choosing a new pointer for a newly allocated data block containing the unaltered data content (Haskin, paragraph 0081); *It should be noted that the "ditto disk address" acts as the "new pointer" for the newly allocated indirect block.*

setting bits in block allocation structures for the newly allocated data block (Haskin, paragraph 0058). *It should be noted that the "block allocation map" is analogous to the "block allocation structures."*

placing the new pointer to the newly allocated data block into the field of the writable vdisk indirect block to replace the hole (Cameron, col. 7, lines 18-20; Fig. 7, element 604).

12. **As per claim 4**, the combination of Haskin/Cameron discloses freeing the dirty data block (Haskin, paragraph 0177); *It should be noted that "deleting" is analogous to "freeing."*

writing the newly allocated data block to disk (Haskin, paragraph 0177). *It should be noted that "flushing disk access buffers to disk" is analogous to "writing to disk."*

13. **As per claim 5**, the combination of Haskin/Cameron discloses releasing an association of the writable vdisk to the backing store to thereby separate the writable disk data blocks from the backing store data blocks (Haskin, paragraph 0112). *It should be noted that by "deleting" the snapshot it follows that all associations with the original file system are "released."*

14. **As per claim 6**, the combination of Haskin/Cameron discloses the pointers contained in the writable vdisk indirect block fields and the backing store indirect block fields comprise logical block numbers (VBNs) (Haskin, paragraph 0096).

15. **As per claim 7**, the combination of Haskin/Cameron discloses the invalid pointers contained in the writable vdisk indirect block fields comprise a zero logical volume block number (VBN) (Haskin, paragraph 0072). *It should be noted that "null" values for the disk addresses indicate unallocated blocks, thus, it follows that unallocated blocks have invalid pointers.*

16. **As per claim 8**, the combination of Haskin/Cameron discloses the plurality of fields in the writable vdisk indirect block are a writable vdisk level 1 buffer and the plurality of fields in the backing store indirect block are a backing store level 1 buffer (Haskin, paragraph 0055). *It should be noted that the "inodes" function as "level 1 buffers."*

17. **As per claim 9**, Cameron discloses an apparatus for operation a computer data base, comprising:

a writable virtual disk (vdisk) created at a selected time, the writable vdisk referencing changes in data stored in the data storage system after the writable vdisk was created, the writable vdisk having a plurality of holes where each hole is at locations referencing data which has not been changed since the writable vdisk was created (col. 7, lines 18-20; Fig. 1, element 204-j; Fig. 7, element 604); *See the citation note for the similar limitation in claims 23 and 39 above.*

a backing store, the backing store referencing data stored in the data storage system which has not been changed since the writable vdisk was created (col. 7, lines 18-20; Fig. 1, element 204-j; Fig. 7, element 604); *See the citation note for the similar limitation in claims 23 and 39 above.*

a special loading function for searching each field of the writable vdisk indirect block for one or more fields representing a hole; and a write allocator for replacing each field representing a hole in the writable vdisk indirect block with a new pointer to the data referenced by the corresponding backing store indirect block field to update the writable vdisk to reference both the data which is unchanged since the writable vdisk was created and the data which has been changed since the writable vdisk was created (col. 2, lines 31-35; col. 7, lines 18-24). *It should be noted that the "storage management program" provides the functionality of the "special loading function" and the "write allocator." Also, see the citation note for the similar limitation in claims 23 and 39 above.*

Cameron does not expressly disclose a backdoor message handler adapted to load blocks of the writable vdisk and backing store from disk into the storage system.

a writable vdisk indirect block in memory having a plurality of fields, each field storing a valid pointer to a data block or an invalid pointer representing a hole.

a backing store indirect block in the memory having a plurality of fields, each backing store indirect block field corresponding to a field of the writable vdisk indirect block, each backing store indirect block field having a pointer to a data block.

Haskin discloses a backdoor message handler adapted to load blocks of the writable vdisk and backing store from disk into the storage system (paragraph 0053); *It should be noted that Haskin's "computer processing device" (paragraph 0050) functions as a "backdoor message handler."*

a writable vdisk indirect block in memory having a plurality of fields, each field storing a valid pointer to a data block or an invalid pointer representing a hole (paragraph 0063; Fig. 2B).

a backing store indirect block in the memory having a plurality of fields, each backing store indirect block field corresponding to a field of the writable vdisk indirect block, each backing store indirect block field having a pointer to a data block (paragraph 0095; Fig. 8D); *See citation note for the similar limitation in claim 1 above.*

Haskin and Cameron are analogous art because they are from the same field of endeavor, that being file system snapshots.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to apply Haskin's ditto address feature to Cameron's snapshots because all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded the predictable results of efficiently utilizing system kernel memory within data processing equipment to support time sensitive processing tasks such as external data communications processing.

Therefore, it would have been obvious to combine Cameron and Haskin for the benefit of obtaining the invention as specified in claim 9.

18. **As per claim 10**, the combination of Haskin/Cameron discloses a new pointer for a newly allocated data block containing an unaltered data content (Haskin, paragraph 0081), set bits in block allocation structures for the newly allocated data block (Haskin, paragraph 0058), and place the new pointer to the newly allocated data block into the

field of the writable vdisk indirect block to replace the hole (Cameron, col. 7, lines 18-20; Fig. 7, element 604). *See the citation notes for claim 3 above.*

19. **As per claim 11**, the combination of Haskin/Cameron discloses the write allocator is further adapted to:

free the dirty data block and write the newly allocated data block to disk (Haskin, paragraph 0177). *See the citation notes for claim 4 above.*

20. **As per claim 12**, the combination of Haskin/Cameron discloses the backdoor handler loads blocks of writable vdisk and the blocks of the backing store during periods of reduced processing activity (Haskin, paragraph 0053). *It should be noted that the blocks are loaded during periods other than when the blocks are being updated, thus when compared to periods of block updating, the loading periods have reduced processing activity.*

21. **As per claim 13**, the combination of Haskin/Cameron discloses the pointers contained in the writable vdisk indirect block fields and the backing store indirect block fields comprise logical block numbers (VBNs) (Haskin, paragraph 0096).

22. **As per claim 14**, the combination of Haskin/Cameron discloses the invalid pointers contained in the writable vdisk indirect block fields comprise a zero logical volume block number (VBN) (Haskin, paragraph 0072). *See the citation note for claim 7 above.*

23. **As per claim 15**, the combination of Haskin/Cameron discloses the plurality of fields in the writable vdisk indirect block are a writable vdisk level 1 buffer and the

plurality of fields in the backing store indirect block are a backing store level 1 buffer (Haskin, paragraph 0055). *See the citation note for claim 8 above.*

24. **As per claim 19**, Cameron discloses a method for operating a data storage system, comprising:

means for creating a writable virtual disk (vdisk) at a selected time, the writable vdisk referencing changes in data stored in the data storage system after the writable vdisk was created, the writable vdisk having a plurality of holes where each hole is at a location referencing data which has not been changed since the writable vdisk was created (col. 1, lines 61-64; col. 7, lines 14-17; Fig. 1, element 202; Fig. 7, element 602); *See the citation note for the similar limitation in claims 23 and 39 above.*

means for maintaining a backing store, the backing store referencing the data stored in the data storage system which has not been changed since the writable vdisk was created (col. 7, lines 18-20; Fig. 1, element 204-j; Fig. 7, element 604); *It should be noted that the computer readable medium of claim 20 executes the exact same functions as the method of claim 1. Therefore, any reference(s) that teach claim 1 also teach corresponding claim 20. Also, see the citation note for the similar limitation in claims 23 and 39 above.*

means for searching each field of the writable vdisk for a hole; and means for referencing each hole in the writable vdisk to point to the data block referenced by the corresponding backing store indirect block to update the writable vdisk to reference both the data which is unchanged since the writable vdisk was created and the data which

has been changed since the writable vdisk was created (col. 7, lines 18-24). See the citation note for the similar limitation in claims 23 and 39 above.

Cameron does not expressly disclose means for loading blocks of the writable vdisk from a disk into a memory, the loaded blocks including a writable vdisk indirect block having a plurality of fields, each field storing a valid pointer to a data block or an invalid pointer representing a particular hole of the plurality of holes;

means for loading blocks of the backing store from a disk into memory, the loaded blocks including a backing store indirect block having a plurality of fields, each backing store indirect field corresponding to a field of the writable vdisk indirect block, one or more backing store indirect block fields having a pointer to a data block.

Haskin discloses means for loading blocks of the writable vdisk from a disk into a memory, the loaded blocks including a writable vdisk indirect block having a plurality of fields, each field storing a valid pointer to a data block or an invalid pointer representing a particular hole of the plurality of holes (paragraph 0053; paragraph 0063; Fig. 2B);

means for loading blocks of the backing store from a disk into memory, the loaded blocks including a backing store indirect block having a plurality of fields, each backing store indirect field corresponding to a field of the writable vdisk indirect block, one or more backing store indirect block fields having a pointer to a data block (paragraph 0053; paragraph 0095; Fig. 8D); *It should be noted that the "snapshot data set" is analogous to the "backing store."*

Haskin and Cameron are analogous art because they are from the same field of endeavor, that being file system snapshots.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to apply Haskin's ditto address feature to Cameron's snapshots because all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded the predictable results of efficiently utilizing system kernel memory within data processing equipment to support time sensitive processing tasks such as external data communications processing.

Therefore, it would have been obvious to combine Cameron and Haskin for the benefit of obtaining the invention as specified in claim 19.

25. **As per claim 24**, the combination of Haskin/Cameron discloses dirtying the data block pointed to by the backing store indirect block to enable write allocation of the dirty data block without altering a data content of the data block (Haskin, paragraph 0079).

See the citation note for claim 2 above.

26. **As per claim 25**, the combination of Haskin/Cameron discloses

choosing a new pointer for a newly allocated data block containing the unaltered data content (Haskin, paragraph 0081); *See the citation note for claim 3 above.*

setting bits in block allocation structures for the newly allocated data block (Haskin, paragraph 0058). *See the citation note for claim 3 above.*

placing the new pointer to the newly allocated data block into the field of the writable vdisk indirect block to replace the hole (Cameron, col. 7, lines 18-20; Fig. 7, element 604).

27. **As per claim 26**, the combination of Haskin/Cameron discloses freeing the dirty data block (Haskin, paragraph 0177); *See the citation note for claim 4 above.*

writing the newly allocated data block to disk (Haskin, paragraph 0177). *See the citation note for claim 4 above.*

28. **As per claim 27**, the combination of Haskin/Cameron discloses releasing an association of the writable vdisk to the backing store to thereby separate the writable disk data blocks from the backing store data blocks (Haskin, paragraph 0112). *See the citation note for claim 5 above.*

29. **As per claim 28**, the combination of Haskin/Cameron discloses including logical volume block numbers (VBNs) in the pointers contained in the writable vdisk indirect block fields and the backing store indirect block fields (Haskin, paragraph 0096).

30. **As per claim 29**, the combination of Haskin/Cameron discloses using a zero logical volume block number (VBN) as the invalid pointers contained in the writable vdisk indirect block fields (Haskin, paragraph 0072). *See the citation note for claim 7 above.*

31. **As per claim 30**, the combination of Haskin/Cameron discloses the plurality of fields in the writable vdisk indirect block are a writable vdisk level 1 buffer and the plurality of fields in the backing store indirect block are a backing store level 1 buffer (Haskin, paragraph 0055). *See the citation note for claim 8 above.*

32. **As per claim 32**, the combination of Haskin/Cameron discloses the data block pointed to by the backing store are dirtied to enable write allocation of the dirty data

block without altering a data content of the data block (Haskin, paragraph 0079). See *the citation note for claim 2 above*.

33. **As per claim 33**, the combination of Haskin/Cameron discloses a new pointer chosen for a newly allocated data block containing unaltered data content (Haskin, paragraph 0081), bits are set in a block allocation structures for the newly allocated data block (Haskin, paragraph 0058), and a new pointer to the newly allocated data block placed into a field of the writable vdisk indirect block to replace the hole (Cameron, col. 7, lines 18-20; Fig. 7, element 604). See *the citation notes for claim 3 above*.

34. **As per claim 34**, the combination of Haskin/Cameron discloses the dirty block is freed; and the newly allocated data block is written to disk (Haskin, paragraph 0177). See *the citation notes for claim 4 above*.

35. **As per claim 35**, the combination of Haskin/Cameron discloses an association of the writable vdisk to the backing store is released to thereby separate the writable vdisk data blocks from the backing store data blocks (Haskin, paragraph 0112). See *the citation note for claim 5 above*.

36. **As per claim 36**, the combination of Haskin/Cameron discloses logical volume block numbers (VBNs) included in the pointers contained in the writable vdisk indirect block fields and the backing store indirect block fields. (Haskin, paragraph 0096).

37. **As per claim 37**, the combination of Haskin/Cameron discloses a zero logical volume block number (VBN) used as the invalid pointers contained in the writable vdisk indirect block fields (Haskin, paragraph 0072). See *the citation note for claim 7 above*.

38. **As per claim 38**, the combination of Haskin/Cameron discloses a writable vdisk level 1 buffer used for the plurality of fields in the writable vdisk indirect block and a backing store level 1 buffer used for the plurality of fields in the backing store indirect block (Haskin, paragraph 0055). *See the citation note for claim 8 above.*

Response to Arguments

39. Applicant's arguments with respect to **claims 1-15, 19, 20, and 23-39** have been considered but are moot in view of the new grounds of rejection above.

Conclusion

STATUS OF CLAIMS IN THE APPLICATION

The following is a summary of the treatment and status of all claims in the application as recommended by MPEP 707.70(i):

CLAIMS REJECTED IN THE APPLICATION

Per the instant office action, **claims 1-15, 19, 20, and 23-39** have received a first action on the merits and are subject of a first action non-final.

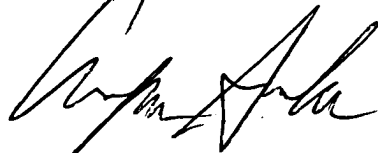
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arpan P. Savla whose telephone number is (571) 272-1077. The examiner can normally be reached on M-F 8:30-5:00.

Application/Control Number:
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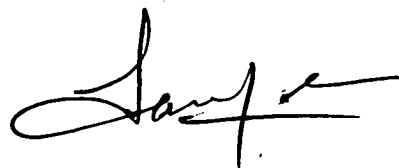
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sanjiv Shah can be reached on (571) 272-4098. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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